SECOND MID TERM TEST - 2024

Standard XII Reg.No. | | | | | | |

BUSINESS MATHEMATICS AND STATISTICS

Time : 1.30 hrs **Part - I** *Marks : 45*

I. Choose the correct answer: **10 x 1 = 10**

1. An experiment succeeds twice as often as it fails. The chance that in the next six trials, there shall be at least four successes is
   a) 240/729 b) 489/729 c) 496/729 d) 251/729
2. The average percentage of failure in a certain examination is 40. The probability that out of a group of 6 candidates atleast 4 passed in the examination are :
   a) 0.5443 b) 0.4543 c) 0.5543 d) 0.4573
3. In a binomial distribution, the probability of success is twice as that of failure. Then out of 4 trials, the probability of no success is
   a) 16/81 b) 1/16 c) 2/27 d) 1/81
4. For Binomial Distribution, Variance is _____ than mean
   a) greater b) less c) equal d) zero
5. A _____ may be finite or infinite according as the number of observations or items in it is finite or infinite.
   a) population b) census c) parameter d) none of these
6. A random sample is a sample selected in such a way that every item in the population has an equal chance of being included
   a) Harper b) Fisher c) Karl Pearson d) Dr. Yates
7. _____ is a relative property, which states that one estimator is efficient relative to another.
   a) efficiency b) sufficiency c) unbiased d) consistency
8. A time series consists of
   a) Five components b) Four components
   c) Three components d) Two components
9. The additive model of the time series with the components T, S, C and I is
   a) y = T + S + C × I b) y = T + S × C × I
   c) y = T + S + C + I d) y = T + S × C + I
10. Variations due to natural disorder is known as
    a) random cause b) non-random cause c) human cause d) all of them

9) Errors in Sampling - types 2, 3, 4, 5

10) In the parametric distribution mean is equal to variance c) passion

Part - II

II. Answer any 4 questions. 4 x 2 = 8

(Q.No.16 is compulsory)

11. Verify the following statement: The mean of a Binomial distribution is 12 and its standard deviation is 4.
12. Mention the properties of Poisson distribution.
13. A server channel monitored for an hour was found to have an estimated mean of 20 transactions transmitted per minute. The variance is known to be 4. Find the standard error.
14. Mention the two branches of statistical inference?
15. Fit a trend line by the method of semi-averages for the given data.

Year	1990	1991	1992	1993	1994	1995	1996	1997
Sales	15	11	20	10	15	25	35	30

16. A machine drills hole in a pipe with a mean diameter of 0.532 cm and a standard deviation of 0.002 cm. Calculate the control limits for mean of samples 5.

Part - III

III. Answer any 4 questions. 4 x 3 = 12

(Q.No.20 is compulsory)

17. Write down any three chief characteristics of Normal probability curve.
18. Suppose A and B are two equally strong table tennis players. Which of the following two events is more probable: a) A beats B exactly in 3 games out of 4 or b) A beats B exactly in 5 games out of 8?
19. In a sample of 400 populations from a village 230 are found to be eaters of vegetarian items and the rest non-vegetarian items. Compute the standard error assuming that both vegetarian and non-vegetarian foods are equally popular in that village?
20. What is null hypothesis? Give an example.
21. Calculate four-yearly moving averages of number of students studying in a higher secondary school in a particular city from the following data.

Year	2001	2002	2003	2004	2005	2006	2007	2008	2009
Number of students	124	120	135	140	145	158	162	170	175

22) A fair coin is tossed 6 Times. find the pro. that exactly 2 heads occured.

22. Construct the cost of living index number for 2011 on the basis of 2007 from the given data using family budget method.

Commodities	Price		Weights
	2007	2011	
A	350	400	40
B	175	250	35
C	100	115	15
D	75	105	20
E	60	80	25

Part - IV

IV. Answer all the questions. (open choice) **3 x 5 = 15**

23 a) Forty percent of business travellers carry a laptop. In a sample of 15 business travelers, (i) What is the probability that 3 will have a laptop? (ii) what is the probability that 12 of the travelers will not have a laptop? (iii) what is the probability that atleast three of the travelers have a laptop?

(OR)

b) The following data show the values of sample mean ($\bar{X}$) and its range (R) for the samples of size five each. Calculate the values for control limits for mean , range chart and determine whether the process is in control.

Sample number	1	2	3	4	5	6	7	8	9	10
Mean	11.2	11.8	10.8	11.6	11.0	9.6	10.4	9.6	10.6	10.0
Range	7	4	8	5	7	4	8	4	7	9

(Given for n = 3, $A_2 = 0.58$, $D_3 = 0$ and $D_4 = 2.115$)

24. a) The average number of phone calls per minute into the switch board of a company between 10.00 am and 2.30 pm is 2.5. Find the probability that during one particular minute there will be (i) no phone at all (ii) exactly 3 calls (iii) atleast 5 calls. ($e^{-2.5} = 0.08208$)

(OR)

b) A bank manager has observed that the length of time the customers have to wait for being attended by the teller is normally distributed with mean time of 5 minutes and standard deviation of 0.6 minutes. Find the probability that a customer has to wait (i) for less than 6 minutes (ii) between 3.5 and 6.5 minutes.

25. a) Compute (i) Laspeyre's (ii) Paasche's (iii) Fisher's Index numbers for the 2010 from the following data.

Commodity	Price		Quantity	
	2000	2010	2000	2010
A	12	14	18	16
B	15	16	20	15
C	14	15	24	20
D	12	12	29	23

(OR)

b) An ambulance service claims that it takes on the average 8.9 minutes to reach its destination in emergency calls. To check on this claim, the agency which licenses ambulance services has them timed on 50 emergency calls, getting a mean of 9.3 minutes with a standard deviation of 1.6 minutes. What can they conclude at 5%the level of significance?

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